

Abstract of the Disclosure

A layer-by-layer etching apparatus and an etching method using a neutral beam which enables to control etching depth to an atomic level by controlling the etching of each atom of a material layer to be etched under precise control of the supply of an etching gas and irradiation of the neutral beam and enables to minimize etching damage. In the layer-by-layer etching method, a substrate to be etched, on which a layer to be etched is exposed, is loaded on a stage in a reaction chamber. An etching gas is supplied into the reaction chamber to adsorb the etching gas on the surface of an exposed portion of the layer to be etched. Excessive etching gas remaining after being adsorbed is removed. A neutral beam is irradiated on the layer to be etched on which the etching gas is adsorbed. Etch by-products generated by the irradiation of the neutral beam is removed.